Contact: Patty Nelson, Phone (602) 506-6709, Fax (602) 506-6179
E-mail: pnelson@mail.maricopa.gov.

REGULATION III - CONTROL OF AIR CONTAMINANTS
NEW RULE 324
STATIONARY INTERNAL COMBUSTION (IC) ENGINES

INDEX

401 COMPLIANCE SCHEDULE

SECTION 500 - MONITORING AND RECORDS

~~501COMPLIANCE SCHEDULE~~
~~502~~501 COMPLIANCE DETERMINATION
~~503~~502 RECORDKEEPING/RECORDS RETENTION
~~504 STATIONARY IC ENGINE~~
503~~5~~ TEST METHODS

Contact: Patty Nelson, Phone (602) 506-6709, Fax (602) 506-6179
E-mail: pnelson@mail.maricopa.gov.

MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS
REGULATION III - CONTROL OF AIR CONTAMINANTS

NEW RULE 324
STATIONARY INTERNAL COMBUSTION (IC) ENGINES

SECTION 100 - GENERAL

101 PURPOSE: To limit carbon monoxide (CO), nitrogen oxides (NO_x), sulfur ~~di~~oxide~~s~~ (SO_X), volatile organic compounds (VOCs) and particulate matter (PM) from stationary internal combustion (IC) engines.

102 APPLICABILITY: The provisions of this rule shall apply to any single ~~or one~~ existing or new stationary reciprocating IC ~~internal combustion~~ engine with a ~~horsepower~~ rating of greater than 250 horsepower (bhp) ~~or greater,~~ or to a combination of IC ~~internal combustion~~ engines each greater than 50 bhp used in the same process at one source, either spark or compression driven, whose maximum accumulative brake horsepower is ~~equal to or more~~ greater than 250 horsepower. ~~and is either spark or compression driven.~~

103 EXEMPTIONS: The requirements of this rule shall not apply to the following types of IC engines:

103.1 A rotary motion ~~-~~gas turbine ~~that operates with a rotary motion~~.

~~**103.2 A jet engine.**~~

103.~~2~~3 Military tactical equipment.

~~**103.4 Any stationary IC engine manufactured on or before July 13, 1988.**~~

103.~~3~~5 Any stationary IC engine operated solely as an emergency generator for either of the following reasons and if the operating hours are less than 500 hours per year for each engine:

a. Used only for power when normal power service fails from the serving utility or failure of onsite electrical transmission equipment

b. Used only for the emergency pumping of water resulting from a flood or fire or life-threatening situation

~~if the horsepower rating does not exceed 250 bhp or if the total combined operating hours are less than 500 hours per year for routine testing and emergency standby operation for each IC engine. and provided such source demonstrates that the potential emissions at 500 hours of operation each of all IC engines do not exceed 4,000 pounds of nitrogen oxides or carbon monoxide per year, as evidenced by an installed hour meter or written usage records maintained by the operator.~~

c. Any emergency engine, provided that the operation of the engine for non-emergency purposes such as engine readiness, calibration or maintenance does not exceed 52 hours of the total 500 allowable hours per calendar year. Operation for testing or maintenance purposes may be allowed for not more than 100 hours per year, with written authorization from the Control Officer, provided that the owner or operator

demonstrates to the satisfaction of the Control Officer that such additional operation is necessary.

d. This exemption shall not apply to those engines used as standby power due to a voluntary reduction in power by a utility or power company or for supplying power for distribution or sale to the grid.

e. This exemption shall not apply to those engines used for the purpose of supplying power at a source in order to avoid peak demand charges or to avoid high electric energy prices during on-peak price period.

103.4 An IC engine operated ~~for power generation~~ as a portable ~~source~~ engine.

103.5 An IC engine used directly and exclusively by the owner and/or operator for agricultural operations necessary for the growing of crops or ~~for~~ the raising of fowl or animals.

~~**103.** An IC engine used directly and exclusively for fire-fighting and flood control purposes.~~

103.6 An IC engine used directly and exclusively for research, development and testing purposes, ~~or for the advancement of IC engine performance~~including solar research and testing programs.

103.7 An IC engine used for the advancement of IC engine performance and subsequent performance verification.

SECTION 200 – DEFINITIONS: For the purpose of this rule, the following definitions shall apply. See Rule 100 (General Provisions And Definitions) of these rules for definitions of terms that are used but not specifically defined in this rule.

201 AFTERCOOLER/INTERCOOLER – A system which cools the engine intake after the turbocharger and prior to the introduction into the cylinder, thereby lowering NOX emissions.

~~201~~**202 BRAKE HORSEPOWER –** The maximum brake horsepower (bhp) rating at maximum revolutions per minute specified by the engine manufacturer and usually listed on the nameplate of the ~~portable IC~~ engine.

203 COMPRESSION IGNITION ENGINE – An engine with operating characteristics significantly similar to the diesel combustion cycle. Not using a throttle to regulate intake airflow for controlling power during normal operation is indicative of a compression-ignition engine.

~~**202**~~**204 DIESEL ENGINE** – Any compression-ignited ~~internal combustion~~ IC ~~-~~engine.

~~203**DUAL-FUEL ENGINE** – Any IC engine which is designed to burn a liquid and a gaseous fuel mixture during a single operating cycle.~~

205~~**204**~~ **EMERGENCY GENERATOR –** Any stationary IC engine/~~-~~generator whose sole function is to provide back-up power when electric power from the local utility is interrupted.

206 ENGINE FAMILY- A group of engines expected to have similar emission and other characteristics throughout their useful life, which include fuel, cooling medium, method of air aspiration, method of exhaust aftertreatment, combustion chamber design, bore, stroke, number of cylinders, and

cylinder arrangement.

207 **EQUIVALENT REPLACEMENT ENGINE -** An engine that is substituted for a stationary IC engine that is intended to perform the same or similar function as the original engine and where all of the following conditions exist:

1. The replacement engine results in equal or lower air contaminant emissions than the existing engine, expressed as a mass per unit time; and
2. The replacement engine meets the emission control technology standards contained in Table 1 or Table 2 of this rule; and
3. The manufacturer's maximum rated capacity of the replacement engine does not exceed the maximum rated capacity of the existing engine.

208 **EXISTING ENGINE** - An engine which is in operation and permitted prior to (date of adoption of this rule), or an engine on which the construction or modification has commenced and for which the Control Officer has granted a permit prior to (date of adoption of this rule).

209 **IDENTICAL REPLACEMENT ENGINE –** An engine that is substituted for an existing stationary IC engine that has the same manufacturer type, model number, manufacturer's maximum rated capacity and brake horsepower and is intended to perform the same or similar function as the original stationary ICE and has equal or lower emissions or meets the emission control technology requirements in Table 1 or 2.

~~204~~**210** **INTERNAL COMBUSTION (IC) ENGINE, PORTABLE -** Any reciprocating, piston-driven IC engine that is capable of being carried or moved from one ~~location~~ source to another by, but not limited to, wheels, skids, carrying handles, dollies, trailers, or platforms~~. An engine is not portable if it~~ and remains at 1 specific ~~location~~ source for ~~more~~ less than 12 consecutive months. ~~An indication of portability may include, but is not limited to, wheels, skids, carrying handles, dollies, trailers, or platforms~~.

2**11**~~06~~ **INTERNAL COMBUSTION (IC) ENGINE, STATIONARY -** Any reciprocating, piston-driven IC engine that is operated or intended to be operated at 1 specific ~~location~~ source for more than 12 consecutive months or that is attached to a foundation at the location.

~~**JET ENGINE** – An engine used in aircraft.~~

212 **LEAN-BURN ENGINE –** Any spark or compression ignited IC engine that is designed to operate with an air-to-fuel ratio that is more than 1.1 times the stoichiometric air-to-fuel ratio. The engine is called lean burn because it operates oxygen rich and fuel lean.

213 **LOW SULFUR OIL** – Fuel oil containing less than or equal to 0.05 percent (%) by weight of sulfur.

2**14**~~08~~ **MILITARY TACTICAL EQUIPMENT** – Any transportable engine operated by the United States armed forces or National Guard ~~which~~ that is designed specifically for military use off-road, in dense terrain, in a hostile environment, or aboard military combat vessels.

215 **NEW ENGINE** - An engine that is in operation and permitted after (date of adoption of this rule) or an engine on which the construction or modification has commenced and for which the Control Officer has granted a permit after the (date of adoption of this rule).

~~209~~**216** **NO_X –** Oxides of nitrogen calculated as equivalent nitrogen dioxide.

217 PARTICULATE MATTER – Any material, except condensed water containing no more than analytical trace amounts of other chemical elements or compounds, which has a nominal aerodynamic diameter smaller than 100 microns (micrometers), and which exists in a finely divided form as a liquid or solid at actual conditions.

218 PART(S) PER MILLION, DRY VOLUME (ppmdv) – A unit of proportion equal to 10^{-6} that is measured on a dry basis (minus water). For NOx, VOC, and CO measurement, it is corrected to 15% oxygen and is the arithmetic average of (3) 1-hr. runs.

219 PROCESS - One or more operations, including technology and equipment, used in the production of goods and services or the control of by-products of waste. In the case of IC engines, the operation of more than one leads to the same end and is a potential emitter of air pollutants.

220 RICH-BURN ENGINE - Any spark-ignited IC engine that is operated with an air-to-fuel ratio that is less than 1.1 times the stoichiometric air-to-fuel ratio. The engine is called rich burn because it operates oxygen lean and fuel rich.

221 SHUTDOWN – The period of time during which a stationary IC engine is allowed to cool from its normal temperature range to a cold or ambient temperature by following a prescribed set of separate steps or operations that take the unit down to an inactive status from its normal operating status.

222 SPARK-IGNITION ENGINE - An engine wherein the fuel is usually mixed with intake air before introduction into the combustion chamber, resulting in a relatively homogeneous air/fuel mixture in the combustion chamber, at which time a spark plug ignites the air/fuel mixture.

~~**10 SOx** - Oxides of sulf calculated as equivalent sulfur dioxide.~~

223 START-UP- The period of time during which a stationary IC engine is heated up to its normal operating temperature range from a cold or ambient temperature by following a prescribed series of separate steps or operations that bring the unit up to a normal operating status from its inactive status.

224 STOICHIOMETRIC AIR-TO-FUEL RATIO - The chemically balanced ratio of air related to fuel at which all fuel and all oxygen in the air and fuel mixture are theoretically balanced.

SECTION 300 – STANDARDS

301 LIMITATIONS FOR STATIONARY ENGINES:

301.1 For any applicable existing or new stationary IC engine, an owner or operator shall conduct maintenance procedures at least once a year or every 8,000 hours, whichever comes first, as recommended by the engine manufacturer or, in lieu of a manufacturer's procedure, a procedure specified by any other maintenance procedure approved in writing by the Control Officer. At a minimum the procedure shall include:

a. Calibration of meters and relays;
b. Inspection of engine to generator alignment;
c. Inspection and subsequent cleaning, if necessary, of generator air flow, windings, air gaps, connections, rotating diodes, lead wire connections, generator mounting belts and coupling belts;

d. Performance of winding megger test;
e. Inspection and retorquing of bus bar and electrical connections;
f. Inspection and relubrication of bearings;
g. Inspection, testing and retorquing of circuit breakers;
h. Cleaning and lubrication of circuit breakers and sliding contacts.

301.2 For any applicable existing or new stationary IC ~~internal combustion~~ engine ~~manufactured after July 13, 1988~~, the engine shall not:

a. Discharge air contaminants into the ambient air in excess of 20% opacity ~~at ¾ load or~~

b. Exceed PM emissions of 0.10 grains per standard dry cubic foot corrected to 12% oxygen.

c. Exceed the applicable requirements of either Table 1 for applicable existing compression-ignition engines or Table 2 for applicable existing spark-ignition engines.

d. Exceed the limitations in Table 3 for applicable new spark-ignition and compression-ignition engines. In lieu of testing to meet these numerical standards, a certification statement from the manufacturer of the engine that the engine meets the most stringent emissions standards for the applicable horsepower range specified in the certification procedures in 40 CFR Part 89 for compression-ignition engines or in 40 CFR Part 90 for spark-ignition engines, shall be proof of compliance with the standards in Section 300.

301.3 For any applicable existing or new stationary IC engine when burning any fuel oil, alone or in combination with other fuels, the owner or operator shall not use any fuel oil that contains more than 0.05% sulfur by weight except:

a. Existing supplies as of (insert date of adoption of rule or go back further cause fact that we know oil is being brought into plant) in storage of any liquid fuel or any used oil containing greater than 0.05% by weight of sulfur may be used by the owner or operator until (insert 1.5 years after adoption of rule). This usage shall be reported to the Control Officer along with the dates of usage.

TABLE 1: COMPRESSION–IGNITION ENGINE

POLLUTANT EMISSION NOx EMISSION LIMITS OR CONTROL TECHNOLOGY REQUIREMENTS

Rated Brake Horsepower (bhp)	Engine Requirements
250-399	81770 ppmdv NOx (10.05 g/bhp-hr.) or turbocharger with aftercooler/intercooler or 4-degree injection timing retard
400-749 plus	550 ppmdv NOx (10.07.2 g/bhp-hr.) or turbocharger with and aftercooler/intercooler or 4-degree injection timing retard
750 plus	550 ppmdv Nox (7.2 g/bhp-hr.) or turbocharger and aftercooler/intercooler or 4-degree injection timing retard

Note: For the purpose of compliance with this rule, ppmdv is parts per million NOx as NO2@ 15% oxygen averaged over 15 consecutive minutes.

TABLE 2: SPARK–IGNITION ENGINE REQUIREMENTS

POLLUTANTNOx EMISSION LIMITS OR CONTROL TECHNOLOGY REQUIREMENTS

OXIDES OF NITROGEN (NOx)	VOLATILE ORGANIC CARBONCOMPOUND (VOC)	CARBON MONOXIDE (CO)
213 ppmdv (4.0 g/bhp-hr) or three-way catalyst •	800 ppmdv (5.0 g/bhp-hr) or three-way catalyst •	2,000 ppmv on a dry basis corrected to 15% oxygen (CURRENTLY PERMITTING 25,344 PPMDV OR CATALYST 4,500 ppmdv (51 g/bhp–hr.) or three-way catalyst•

- The three-way catalyst shall provide a minimum of 80% control efficiency of NOx and CO and a minimum of at least 50% efficiency for VOC.

302 **New Stationary IC Engine:** Any new stationary IC engine shall meet the standards of the Code of Federal Regulations, CFR 40 Part 89 by (date of adoption of rule) .

TABLE 3: NEW ENGINE LIMITATIONS

ENGINE TYPE	NOx	PM	CO
LEAN BURN	1.50 g/bhp-hr.	Non-Applicable	4,500 ppmdv (51g-bhp-hr.)
RICH BURN	0.30 g/bhp-hr.	Non-Applicable	4,500 ppmdv (51g-bhp-hr.)
DIESEL	6.9 g/bhp-hr.	0.40 g/bhp-hr	8.50 g-bhp-hr. (748 ppmdv)

302 EXCEPTION TO STANDARDS:

302.1 Start-up and Shutdown –

a. During the period of time when a stationary IC engine is either heated up to its

normal temperature from a cold or ambient temperature or allowed to cool from its normal temperature range to a cold or ambient temperature, visible emissions exceeding the opacity standards in Section 300 for three minutes resulting from start-up and shutdown shall be allowed, provided that the Control Officer finds that adequate control technology has been applied. At no time during these exceptions shall the opacity of any plume or effluent from the engine, other than uncombined water, ever exceed 40%.

b. The nitrogen oxides, carbon monoxide, or volatile organic compound standards in Tables 1-3 of this rule do not apply during start-up and shutdown of a stationary IC engine.

302.2 Emergency Diesel Generators Regulated by Nuclear Regulatory Commission - When emergency diesel generators (EDS) and equipment must run for safety reasons and/or for safety and operational tests to meet the requirements legally imposed by the Nuclear Regulatory Commission, a person may discharge air contaminants, other than uncombined water, in excess of the applicable opacity limit in subsection 301.2 of this rule. However, any discharge of air contaminants, other than uncombined water, in excess of the opacity limit in subsection 301.2 of this rule should not contribute to a violation of the national ambient air quality standard.

SECTION 400 - ADMINISTRATIVE REQUIREMENTS ~~(NOT APPLICABLE)~~

401 COMPLIANCE SCHEDULE:

401.1 An owner or operator of an existing stationary IC engine that becomes subject to any of the emission limits of this rule listed in Section 300 and that does not need modification or add-on controls to meet the emission standards of this rule shall be in compliance by (6 mos. after the rule is adopted).

401.2 An owner or operator of a new stationary IC engine that is subject to any of the emission limits of this rule listed in Section 300 shall be in compliance by (date of adoption of rule).

401.3 An owner or operator of an existing stationary IC engine that must be rebuilt, modified, or retrofitted with add-on control equipment to meet emission limits in Section 300 shall submit a compliance plan for these units by (8 mos. after the rule is adopted).

401.4 An owner or operator of an existing stationary IC engine that must be rebuilt, modified, or retrofitted with add-on control equipment to meet emission limits in Section 300 shall modify the engine or install add-on control equipment to comply with this rule by (2 years after the rule is adopted).

401.5 An owner or operator of an existing stationary IC engine that must be replaced with a new engine shall be in compliance with this rule by (3 yrs. after rule is adopted).

402 NEW ENGINE REPLACEMENT: If an existing engine cannot meet emission limits and a decision is made by the owner or operator to replace the engine with a newer engine instead of retrofitting the engine, the new engine to be acquired shall be duly certified with a manufacturer's certification to the most current standards, per 40 CFR Part 89 or 90. If the engine is not subject to the provisions of Part 89 or Part 90, then a statement of compliance,

with the limitations in Table 3 and using the appropriate test methods listed in Section 503, from the manufacturer shall be considered demonstration of compliance.

403 EQUIVALENT OR IDENTICAL ENGINE REPLACEMENT: An equivalent or identical replacement engine that replaces an existing engine shall be treated as an existing engine for the purposes of compliance with this rule.

SECTION 500 - MONITORING AND RECORDS

501 COMPLIANCE DETERMINATION:

~~**COMPLIANCE SCHEDULE:** An owner of aninternal combustion engine which becomes subject to the emission limits of this ruleshall be in compliance by (6 mos. after rule is adopted???).~~

~~502.1 Engineering data supplied by the owner shall be used to demonstrate compliance if approved by the Control Officer.~~

~~**502.2** If an engine is already certified by a manufacturer to meet the emission limits listed in Section 300, then the Control Officer may accept a statement of certification on the engine from the manufacturer in lieu of testing per test methods in Section 504 by the owner. If there is more than one engine in a class of equipment and the manufacturer has certified that the average of all of the emissions in the class meet the standards listed in Section 300, then that certification of the equipment by the manufacturer is evidence of compliance.~~

501.1 Existing Engines – Applicable stationary IC existing engines or engine families shall demonstrate compliance with emission limitations in Section 300 by proof of engine maintenance and tune up annually or at 8,000 hrs of operation, whichever comes first, according to subsection 301.1, and performance of emission testing per the applicable test methods listed in Section 503, if the Control Officer so requests it.

501.2 Existing Engine Families - In the case of testing of an engine family, at least 10% of the engine family shall be tested and the selection of the engines tested shall be approved by the Control Officer prior to testing. Should any of the representative engines exceed the emission limits, each of the engines in the group shall demonstrate compliance by emissions testing.

501.3 Rebuilt or Modified Engines or Engines Retrofitted with Add-On Control Equipment: If existing engine rebuilds, modifications, or new control equipment add-ons ~~is~~ are necessary to comply with the limitations listed in Section 300~~3~~, ~~then a compliance plan for the modification and add-on control equipment shall be submitted to the Control Officer . Full compliance with this rule shall then be within I year after the approval of the compliance plan~~ then performance of emission testing per the test methods in Section 503 to prove compliance shall be completed by (2.5 years after adoption of rule). ~~The Control Officer may request source testing after the modification or add-on control device is completed to demonstrate compliance.~~

501.4 New Engines: Compliance with the limitations in Section 300 shall be demonstrated by either:

a. A statement from the manufacturer of EPA certification according to 40 CFR Part 89 or Part 90, or

b. Performance of emission testing per the test methods in Section 503.

501.5 New Engine Families: Compliance for new engine families shall be demonstrated by either:

a. A statement from the manufacturer of EPA certification according to 40 CFR Part 89 or Part 90 for the entire engine family, or

b. Performance of emission testing per the test methods in Section 503 and following the selection procedures in Subsection 501.2.

501.6 Low Sulfur Oil Verification: Fuel receipts or contract specifications from the fuel supplier indicating the sulfur content of the fuel shall be submitted to the Control Officer if proof of the sulfur content is requested by the Control Officer. Testing of the fuel oil for sulfur content to meet the 0.05% limit shall be permitted for evidence of compliance.

501.7 Test Methods: The test methods listed in Section 5034 shall be used by the owner or operator ~~or manufacturer~~ to determine compliance with Section 300. ~~of a combustion engine.or combination of internal combustion units at the request of the Control Officer.~~ Testing for stationary IC engines shall be completed under steady state conditions at no less than 80% of the brake horsepower rating. If the owner or operator of an engine demonstrates to the Control Officer that the engine cannot operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous brake horsepower rating or under the typical duty cycle or typical operational mode of the engine. When more than one test method, as listed in subsections 503.118 ~~or~~, 503.129, 503.13, or 503.14, or more than one submethod is permitted for the same determination, an exceedance of the limits established in this rule determined by ~~either~~ any of the applicable test methods constitutes a violation.

502 ~~503~~ RECORDKEEPING/RECORDS RETENTION: The owner or operator of any stationary ~~internal combustion~~IC engine subject to this rule shall comply with the following requirements and keep records for a period of 5 years.

~~502.1~~502.1 Stationary IC Engines ~~Stationary IC Engine: :~~

~~502.2~~

~~Astationary IC engine operating log shall be kept, which includes the total hours of operation, type and quantity of fuel used,, rated brake horsepower, combustion type (rich or lean), engine manufacturer and model designation.~~

a. An initial log that includes a one-time entry of the particular engine combustion type (compression or spark ignition; rich or lean), manufacturer, model designation, and the rated brake horsepower shall be kept by the owner or operator.

b. A daily stationary IC engine operating log shall be kept that includes the actual hours of operation, or an estimate of the hours of operation and the total fuel used in gallons per hour or day, type of liquid and/or gaseous fuel used, and sulfur content of the fuel used, reported in % sulfur. If recordkeeping of actual hours of operation is kept instead of fuel use records, then the engine shall be equipped with an operational and properly maintained non-resettable hour meter.

c. Daily fuel consumption shall be measured by either a fuel flow meter, fuel tank stick test, or by fuel purchase records. If fuel purchase records or a stick test is used, the operator shall record the average operating load of the engine or use the approved operating load default factors and the calculation approved by the Control Officer to determine the daily fuel use for the engine. The stick test shall be performed prior to the start of and after the shutdown of operations on any given day to determine the amount of fuel used on that day. For an engine that operates on a 24-hour basis, the stick test must be performed once at the same time each day of uninterrupted operation and then compared to the previous day's test to calculate the daily fuel use.

502.2 Stationary IC Engines Operated Solely as Emergency Generators – An owner or operator claiming an exemption under Subsection 103.4 shall maintain annual operating records, including support documentation identifying reasons for the exemption and the operating hours for operations that are exempt. Records shall be kept for emergency generators only during the actual hours of operation.

503 TEST METHODS: The Environmental Protection Agency (EPA) test methods and their submethods as they exist in the Code of Federal Regulations (CFR) (July 1, 2000~~1999~~), as listed below, are adopted by reference. The American Society of Testing Materials (ASTM) methods listed below are also adopted by reference, each having paired with it a specific date(s) that identifies the particular version/revision of the method that is adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this section of this rule are available at the Maricopa County Environmental Services Department, 1001 North Central Avenue, Phoenix, Arizona, 85004-1942.

503.1 EPA Reference Methods 1 ("Sample and Velocity Traverses for Stationary Sources") and 1a ("Sample and Velocity Traverses for Stationary Sources with Small Stacks and Ducts") (40CFR 60, Appendix A).

503.2 EPA Reference Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2a ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2c ("Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts") and 2d ("Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts") (40 CFR 60, Appendix A).

503.3 EPA Reference Method 3 ("Gas Analysis for the Determination of Dry Molecular Weight"), 3A ("Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)"), 3B ("Gas Analysis for the Determination of Emission Rate Correction Factor of Excess Air"), and 3C ("Determination of Carbon Dioxide, Methane, Nitrogen and Oxygen from Stationary Sources") (40 CFR 60, Appendix A).

503.4 EPA Reference Method 4 ("Determination of Moisture Content in Stack Gases") (40 CFR 60, Appendix A).

503.5 EPA Reference Method 5 ("Determination of Particulate Emissions from Stationary Sources") (40 CFR 60, Appendix A) and possibly, if requested by the Control Officer, EPA Reference Method 202 ("Determination of Condensable Particulate Emissions from Stationary Sources") (40 CFR 51, Appendix M).

503.6 EPA Reference Method 7 ("Determination of Nitrogen Oxide Emissions from Stationary Sources"), 7A ("Determination of Nitrogen Oxide Emissions form Stationary Sources"), 7B ("Determination of Nitrogen Oxide Emissions from Stationary Sources – Ultraviolet Spectrometry"), 7C ("Determination of Nitrogen Oxide Emissions from Stationary Sources – Alkaline-Permanganate Colorimetric Method"), 7D ("Determination of Nitrogen Oxide Emissions from Stationary Sources – Alkaline – Permanganate Chromatographic Method"), 7E ("Determination of Nitrogen Oxide Emissions from Stationary Sources – Instrumental Analyzer Method"), (40 CFR Part 60 , Appendix A).

503.7 EPA Reference Method 9 ("Visual Determination of the Opacity of Emissions from Stationary Sources") (40 CFR 60, Appendix A).

503.8 EPA Reference Method 10 ("Determination of Carbon Monoxide from Stationary Sources") (40 CFR 60, Appendix A).

503.9 EPA Reference Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography") (40 CFR 60, Appendix A).

503.10 EPA Reference Method 25A ("Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer") (40 CFR 60, Appendix A).

~~**503.10**~~**503.11** American Society of Testing Materials, ASTM Method #D2622-98 ("Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry"), 1998.

~~**503.11**~~**503.12** American Society of Testing Materials, ASTM Method #D1266-98 ("Standard Test Method for Sulfur in Petroleum Products (Lamp Method)"), 1998.

503.13 American Society of Testing Materials, ASTM Method #D2880-71, 78 or 96 ("Standard Specification for Gas turbine Fuel Oils"), 1971 or 1978 or 1996.

503.14 American Society of Testing Materials, ASTM Method #D4294-98 ("Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluoresence Spectroscopy") 1990 or 1998.

~~**504.1** EPA Reference Method 1 ("Sample and Velocity Traverses for Stationary Sources") (40 CFR Part 60, Appendix A).~~

~~**504.2**EPA Reference Method 2 ("Determination of Stack Gas Velocity and Volumetric Flow ") (40 CFR Part 60, Appendix A).~~

~~**504.3** EPA Reference Method 3 ("Gas Analysis for the Determination of Dry Molecular Weight") (40 CFR Part 60, Appendix A).~~

~~**504.4** EPA Reference Method 7 ("Determination of Nitrogen Oxide Emissions from Stationary Sources") (40 CFR Part 60, Appendix A).~~

~~**504.5** EPA Reference Method 9 ("Visual Determination of the Opacity of Emissions from Stationary Sources") (40 CFR Part 60, Appendix A).~~

~~**504.6** EPA Reference Method 10 ("Determination of Carbon Monoxide Emissions From Stationary Sources") (40 CFR Part 60, Appendix A).~~

~~**504.7** EPA Reference Method 25 ("Determination of Total Gaseous Nonmethane Organic Emissions as Carbon") (40 CFR Part 60, Appendix A).~~